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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,957	08/17/2001	Koichi Uj	900-398	2405

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

5K

Office Action Summary	Application No. 09/930,957	Applicant(s) UI ET AL.	
	Examiner Rudy Zervigon	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-8 and 12-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-8 and 12-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/553,148.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 17, 2004 has been entered.

Specification

2. The disclosure is objected to because of the following informalities: The specification identifies the physical dimension for sheet resistance as " Ω/\square ". The " \square " dimension remains unrecognized.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 6-8, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oda et al (USPat. 5,252,132) in view of Bartholomew et al (USPat. 5,136,975). Oda teaches film deposition apparatus (Figures 10, 11; column 8, lines 1-28) including:
- i. Heating means - Support for this portion of claim 6 is found in the specification in paragraph [0053]. Specifically, the specification teaches "any known methods can be used". Oda teaches a heater (12). As such, Oda teaches an equivalent apparatus that performs the

Art Unit: 1763

function of heating a substrate (2). As a result, Oda's prior art element 12 for heating performs the identical function of heating the substrate in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183). Oda's heater (12) heats the substrate to a predetermined temperature (column 8; lines 1-15), as claimed by claim 6.

- ii. dispersion heads ("nozzles", 37) for discharging plural gases independently – Specifically, Oda teaches nozzles 37 where "each of which has at least one reaction gas nozzle port 37a for ejection of a reaction gas 38. The rates of supply of the reaction gas to the respective reaction gas supply nozzles 37 are independently controlled by means of a mass flow controller..." as such, each of his deposition heads is capable of flow control for plural gases.
- iii. Means for introducing the gaseous titanium compound into a first dispersion head, and means for introducing the gaseous compound of a dopant element into a second dispersion head – Support for this portion of claim 6 is found in paragraph [0058]. Specifically, the specification teaches "The titanium compound and the compound of the dopant element, both in a gaseous state, are passed through gas lines 7 and 8, respectively, and supplied to the surface of the silicon substrate 1 from a dispersion head 5. ". Oda teaches gas lines 37, Figure 10, column 8, lines 1-18. As such, Oda teaches an equivalent apparatus that performs the function of conveying gases. As a result, Oda's prior art elements of gas lines 37 for conveying gases perform the identical function of conveying gases in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Art Unit: 1763

With regard to Applicant's claim limitations of "gaseous titanium" and "dopant element", it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- iv. Oda further teaches means for positioning a bottom discharge end of the first dispersion head closer to a surface of the silicon substrate than is a bottom discharge end of the second dispersion head - Support for this portion of claim 6 is found in paragraph [0076], [0098]. Specifically, the specification teaches "In FIG. 4, a distance A from bottom ends of the discharge ports for the gaseous titanium compound and the atmospheric gas to the surface of the silicon substrate 1 was set to 4 mm, for example, and a distance B from a bottom end of the discharge port for the dopant element compound to the surface of the silicon substrate 1 was set to 14 mm, for example. The difference between A and B was 10 mm." Oda teaches that a distance from the bottom ends of any of the discharge ports (37a) of the dispersion heads (any of the plural nozzles 37) to a surface of the substrate (2) is variable and controllable (column 8, lines 17-28). As such, Oda teaches an equivalent apparatus that performs the function of providing a variable distance between Oda's dispersion head and Oda's substrate. As a result, Oda's prior art element of 37 for providing a variable distance between Oda's dispersion head and Oda's substrate perform the identical function of "means

for positioning” in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Oda further teaches that a distance from the bottom ends of any of the discharge ports (37a) of the dispersion heads (any of the plural nozzles 37) to a surface of the substrate (2) is variable and controllable (column 8, lines 17-28). Inclusive, as shown in Figure 10, Oda’s dispersion heads are staggered vertically thus meeting claim 6’s limitation where the distance of a bottom end of one discharge port to the surface of the substrate is greater than the distance of a bottom end of one discharge port to the surface of the substrate for the adjacent dispersion head.

Applicant’s claim 13 and 14 limitations are recitations of intended use of the claimed apparatus. It is well established that apparatus claims must be structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ."(emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Exparte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). The Examiner has stated that the prior art structure of Oda teaches all the structural limitations of the claims as stated above.

Oda does not teach conveyor means. Oda does not teach the distance/partitioned circumference from the bottom ends of his discharge ports to the surface of the substrate and the distance/partitioned circumference from the bottom end of the discharge port of another discharge port to the surface of the silicon substrate is 0.1 to 30 mm. Oda further does not teach

Art Unit: 1763

the relative position between Oda's dispersion head and Oda's substrate surface where "the concentration of the dopant element in the produced titanium oxide film becomes higher from the surface of the titanium oxide film to the surface of the silicon substrate".

Bartholomew teaches a continuous atmospheric pressure CVD device (Figure 4; column 7, lines 37-69). Bartholomew further teaches:

- i. conveyor means - Support for this claim limitation is found in lines 26-30, page 12. Specifically, the specification teaches "...conveyor means is preferably constituted in such a fashion as to be capable of conveying the substrate from a position immediately below the discharge port of the discharge head for the dopant element compound through a position immediately below the discharge port of the dispersion head for the titanium compound in a gaseous state to the portion immediately below the discharge port for the atmospheric gas.". Bartholomew teaches conveyor means (24) capable of conveying the substrate from a position immediately below a discharge port (96; Figure 4) of a discharge head (36; Figure 4; column 3, lines 50-65) through an adjacent position. As such, Bartholomew teaches an equivalent apparatus that performs the function of conveying the substrate. As a result, Bartholomew's prior art element 24 for conveying the substrate perform the identical function of conveying the substrate in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Bartholomew's conveyor to Oda's film deposition apparatus and for Oda to optimize the location of Oda's discharge ports relative to each other and to the substrate.

Art Unit: 1763

Motivation to add Bartholomew's conveyor to Oda's film deposition apparatus is to increase throughput of Oda's semiconductor production as taught by Bartholomew, further, motivation to optimize the location of Oda's discharge ports relative to each other and to the substrate is to control the concentration of reactant gases and to improve uniformity and thickness of the deposited film as taught by Oda (column 8, lines 17-28). Further, would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05). Regarding Applicant's intended use claim limitation of "the concentration of the dopant element in the produced titanium oxide film becomes higher from the surface of the titanium oxide film to the surface of the silicon substrate", it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Response to Arguments

5. Applicant's arguments filed are fully considered but they are not persuasive. Applicant argues that Oda does not teach the claim amended limitations of means plus function for operation of the instant dispersion head - "it is possible to form a titanium dioxide film where a concentration of a dopant element(s) is high in the vicinity of the substrate surface and lower closer to the film surface".

6. In response to applicant's argument that Oda does not teach the claim amended limitations of means plus function for operation of the instant dispersion head, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). In particular, it is clear from Oda's discussion that "A reaction gas 38 is supplied to the substrate 2 through at least two of the reaction gas supply nozzles 37, each of which has at least one reaction gas nozzle port 37a for ejection of a reaction gas 38. The rates of supply of the reaction gas to the respective reaction gas supply nozzles 37 are independently controlled by means of a mass-flow controller which is not shown." (column 8, lines 10-16) provides identically claimed means as discussed above.

7. Applicant's argument that "Oda clearly fails to disclose or suggest that a dispersion head for a gaseous compound of a dopant element(s) is closer to the silicon substrate than is the dispersion head for the gaseous titanium compound as required by claim 6.". Again, the

Art Unit: 1763

Examiner recognizes, as stated above, that Oda teaches the requisite structural limitations as required for conveying Applicant's "gaseous compound of a dopant element(s)" and "gaseous titanium compound".

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (571) 272-1439.

Rudy Zervigon
6/25/4